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Nos. 82-524, 82-545, 82-551

IN THE

Supreme Court of the United States

October Term, 1982

BALTIMORE GAS AND ELECTRIC COMPANY, *et al.*,
Petitioners,

v.

NATURAL RESOURCES DEFENSE COUNCIL, INC.,
Respondent.

UNITED STATES NUCLEAR REGULATORY COMMISSION and UNITED STATES OF AMERICA,
Petitioners,

v.

NATURAL RESOURCES DEFENSE COUNCIL, INC, *et al.*,
Respondents.

COMMONWEALTH EDISON COMPANY, *et al.*,
Petitioners,

v.

NATURAL RESOURCES DEFENSE COUNCIL, INC, *et al.*,
Respondents.

On Writs of Certiorari to the United States Court of Appeals for the District of Columbia Circuit

BRIEF OF RESPONDENT THE STATE OF NEW YORK

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March 1983

Questions Presented

1. Whether, consistent with the National Environmental Policy Act ("NEPA"), the Nuclear Regulatory Commission ("NRC") may prohibit its Licensing Boards from considering the very large uncertainties regarding disposal of nuclear waste during agency decisionmaking on the approval of new nuclear power plants.

2. Whether the NRC, consistent with NEPA, could issue construction permits and operating licenses for new nuclear power plants without disclosing or considering health, socioeconomic and cumulative impacts of nuclear waste on the environment.

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BRIEF OF RESPONDENT THE STATE OF NEW YORK

Preliminary Statement

This brief is submitted by Respondent The State of New York. The State was a party in the consolidated

appeal below, as Petitioner in *The State of New York* v. *Nuclear Regulatory Commission and the United States of America,* Docket No. 79-2110. The decision below, *Natural Resources Defense Council* v. *U.S. Nuclear Regulatory Commission* (D.C. Cir. 1982), vacated the agency action, but dismissed the petition in No. 79-2110. That decision is printed in Petitioners' Appendix in Nos. 82-524 and 82-551 ("Pet. App.") at 1a-69a, and is reported at 685 F.2d 459.*

Statement of the Case

A. Table S-3

This case involves challenges to Table S-3 adopted by the Nuclear Regulatory Commission ("NRC") and its predecessor, the Atomic Energy Commission ("AEC") (collectively referred to as "Commission" or "NRC").** The rule, codified in 10 CFR § 51.20, purports to set forth in numerical terms the environmental impacts created *annually* by a nuclear power plant through specified activities that occur both before and after the uranium is used in the reactor ("uranium fuel cycle")—including the impacts of disposing of high level nuclear waste produced by the reactor. That waste is extremely toxic and also very long-lived. As this Court has noted, a modern nuclear plant

> will produce annually well over 100 pounds of radioactive wastes, some of which will be highly toxic. The

* The State was a participant in the final agency rulemaking. There and in the Court of Appeals the State addressed both environmental and economic issues. By dismissing the petition in No. 79-2110, the Court below rejected only the economic arguments raised by the State.

** The licensing and regulatory authority of the AEC were transferred to the NRC in the Energy Reorganization Act of 1974, 42 U.S.C. § 5801, *et seq.*

> Commission itself, in a pamphlet published by its information office, clearly recognizes that these wastes "pose the most severe potential health hazard. . . ." U.S. Atomic Energy Commission Radioactive Wastes, 12 (1965). Many of these substances must be isolated for anywhere from 600 to hundreds of thousands of years.

Vermont Yankee Nuclear Power Corp. v. *NRDC*, 435 U.S. 519, 538-9 (1978).

The National Environmental Policy Act, 42 U.S.C. § 4321, *et seq.* ("NEPA"), requires Federal agencies to study the environmental impacts of their proposals before taking action that would significantly affect the environment. The statute requires the NRC, before approving the construction or operation of a new reactor, to consider the environmental impacts not only of operating the reactor itself but also of disposing of the radioactive waste. The Commission has chosen to study those impacts generically, through Table S-3, which is then used by the Atomic Safety and Licensing Boards established by the NRC to pass on applications to build or operate nuclear plants. See 10 CFR §§ 2.721, 2.760. Those Boards review an environmental impact statement purporting to discuss the impacts of the plant under consideration. The impact statement reprints Table S-3 to represent the annual environmental impacts of the fuel cycle, and the figures appearing in Table S-3 are not subject to challenge in the licensing process. See 10 CFR §§ 51.20 to 51.26. The Boards are directed to factor the numbers in Table S-3 into the cost-benefit analysis for each plant, in deciding whether or not to grant the application. See 10 CFR §§ 51.20(b), 51.23(c) and 51.26(a).

B. The Zero-Release Assumption

A major issue before this Court is the propriety of the Commission's consideration, under NEPA, of the impacts of nuclear waste disposal. In Table S-3 at the bottom is a section entitled "Effluent-Radiological (Curies)," which represents the radioactivity released to the atmosphere from the fuel cycle activities. In that section there is an entry for "Solids (buried on site)," which includes first an entry for "Other than high level (shallow)"—i.e., low-level waste, which is less toxic—and "TRU and HLW (deep)"—the highly toxic solid wastes which are the focus of this litigation. The Table says that on an annual basis a typical large nuclear power plant will produce 1.1×10^7, or eleven million, curies of radioactive high level waste. But the Table says that this waste will be "[b]uried at Federal Repository," and assumes that none of this radioactivity will ever be released into the atmosphere, throughout the hundreds of thousands of years of toxicity, once the repository is sealed. This is the "zero-release assumption." See Pet. App. 8a.

The zero-release assumption must be considered in light of the fact that no disposal method has been established for the various types of high-level waste, and it is not known if a safe disposal method will be perfected. There are basically two types of uncertainties regarding safe disposal: (i) will suitable disposal sites be found and developed, and if so, will that occur by the time they are needed, and (ii) if developed, will they successfully prevent radioactive material from escaping into the atmosphere for the hundreds of thousands of years of toxicity?

There are many grounds for uncertainty concerning each of these issues. For example, with respect to the development of disposal sites, several sites will be needed for disposal of all the high-level nuclear waste to be produced by existing nuclear plants, yet not even one site has been found to meet all the technical requirements. Moreover, technical problems are known to exist in all of the geographic regions under investigation for potential sites. Similarly, no particular type of rock medium has been found to be suitable, and problems are known to exist with each type under consideration. Also, the technologies used to develop a repository are still being studied, and many questions are still unresolved. Moreover, if the technical problems are eventually overcome, there is likely to be fierce public opposition to building a repository at a given site—with resulting social, political and legal challenges that conceivably could prevent the development of repositories.

Moreover, even assuming that repositories will be built, there are many uncertainties regarding their ability to prevent radiation releases for hundreds of thousands of years. For one thing, because of the many technical and political questions discussed above, it is possible that the Government will proceed with mediocre sites or poor technology just to satisfy demands that a repository be built at an early date. More fundamentally, nuclear waste disposal presents an unprecedented dilemma because of the very long toxicity of many components of the waste. This period of toxicity is many times longer than the entire span of recorded human history. No society has ever attempted to plan that far into the future, or build structures to last that long, or even for hundreds of years. The ability to

predict geologic events affecting the respository site far into the future does not exist. Also, repository construction will represent a new technology, and early failures can be expected. Indeed, repository integrity depends on perfect sealing of the repository, yet no method has been developed to create a seal that will work even for a few centuries, let alone for longer periods. Therefore, even if repositories are built, there would be great uncertainties whether nuclear waste would be safely isolated for the necessary period.

All of these uncertainties have been evaded in the zero-release assumption. Based on that assumption many new plants have been licensed, but if the waste produced by those plants is released into the atmosphere in large quantities, the results could include contamination of land, air and water resources; many deaths, illnesses, birth defects and genetic damage; and the creation of a vast wasteland that must be evacuated and remain uninhibited for many years and probably decades. Thus, the consequences would be extremely grave if the Commission's zero-release assumption proved to be incorrect. But by then it will be too late to remedy the problem, for the new plants will have produced additional waste—and that is precisely why NEPA requires that the impacts be considered *before* action is taken.

The Nuclear Waste Policy Act of 1982, P.L. No. 97-425, 96 Stat. 2201, does not eliminate the uncertainties. The Act sets target dates for deciding on the site of the first waste repository, asking the NRC to approve or reject the license by 1989 or within three years after submission of the application, whichever occurs later. *Id.* at § 114(d),

96 Stat. 2215. However, setting target dates does not solve the outstanding technical dilemmas. If the problems are not resolved by the dates proposed by Congress, the dates will have to be postponed. The Act recognizes many of the unresolved technical problems, and authorizes the Secretary of Energy to conduct research on them by 1990 at a test and evaluation facility. *Id.* § 217(c), 96 Stat. 2250 (proposing generic research on seals, the effects of heat and pressure on a repository, potential failure modes, and models to predict water and brine flows as well as migration of radioactive elements). Congress, however, cannot mandate that the research be successful in overcoming the technical problems.

Apart from failing to resolve technical problems, the Act also fails to resolve the social questions. It provides that the State or Indian tribe in whose area the repository is to be built can veto the site, unless both houses of Congress vote to override the veto. *Id.* at § 115(b)(c), 96 Stat. 2217. The resolution of such conflict is uncertain at this time. In addition, Congress found that "Federal efforts during the past 30 years to devise a permanent solution to the problems of civilian radioactive waste disposal have not been adequate." *Id.* § 111(a)(3), 96 Stat. 2207. This admission of failure of the Federal program in past years can only heighten uncertainty about future successes.

C. The Original and Interim Rules

Table S-3 has gone through various phases—the Original, Interim and Final Rules, all of which have been invalidated. The Commission promulgated its Original version of Table S-3 on April 22, 1974. Pet. App. 224a, 39 F.R.

14188. That Rule was set aside insofar as it related to the issue of nuclear waste, in *Natural Resources Defense Council v. U.S. Nuclear Regulatory Commission*, 547 F.2d 633 (D.C. Cir. 1976). This Court reversed, concluding that the Court of Appeals decision was based on the erroneous view that the NRC rulemaking procedures were inadequate, and remanded "so that the Court of Appeals may review the [Original] rule as the Administrative Procedure Act provides." *Vermont Yankee, supra*, 435 U.S. at 549. Upon remand, the Court of Appeals held the case in abeyance, along with a later challenge to an Interim Table S-3 Rule adopted on March 14, 1977, Pet. App. 240a, 42 F.R. 13803, pending issuance of the Final Rule.

D. The Record on Uncertainties in the Final Rulemaking

The Final Rulemaking was commenced in May 1977. During that proceeding evidence was presented as to the many uncertainties surrounding the zero-release assumption, including statements by the United States Geological Survey ("USGS")—the Federal agency with the most expertise in evaluating the technical suitability of repository sites. For example, a technical report by the USGS, *Geologic Disposal of High Level Radioactive Wastes—Earth Science Perspectives*, USGS Circular 779 (1978), said: "[S]ome key geologic questions are unanswered, and answers are needed before the risk associated with geologic containment [of nuclear waste] can be confidently evaluated." Joint Appendix ("J.A.") 305. The report added that "given the current state of our knowledge, the uncertainties associated with hot wastes that interact chemically and mechanically with the rock and fluid system appear

very high" (J.A. 312). The USGS report went further and questioned whether future conditions at the repository site could be predicted. It said that geology is "a retrodictive rather than a predictive science" (J.A. 323), and that:

> [U]se of the geologic record to predict future events is a formidable task.
>
> * * *
>
> The past rates of occurrence of geologic events and processes have varied widely over time and there appears to be no clear philosophical basis for determining rates for these events or processes in the future.

Id. Also in that report the USGS listed all the information about a site that would be needed to determine whether water intrusion into the repository would allow radioactivity to escape, and said:

> The need for such data severely taxes both the available data base and the technology for generating it. Most of the requisite data are presently unavailable; most of the available data have such large error limits that their usefulness in predictive models is limited.

(J.A. 318).

The USGS, as a party in the rulemaking, discussed the problems with salt deposits as potential sites for repositories. Salt, said USGS, is soluble, and therefore the presence of small quantities of water could undermine the sites:

> . . . In salt systems, however, the introduction of even small amounts of water at elevated temperatures could cause serious loss of mechanical strength, loss of retrievability, and conceivably, movement of waste. Brines are also highly corrosive and would eventually destroy metal canisters and cladding and begin leaching the waste. Available data indicate that in brine-salt

> mixtures, many of the radionuclides will remain in solution rather than being fixed in solid phases; thus, these elements are freed for potential transport [to the atmosphere] if the repository site is breached.

(J.A. 145-6). The USGS also said that "it is not possible at this time to confidently assess the risks in connection with any [rock] medium presently under consideration" for a repository (J.A. 150).

During the hearing before the NRC, a witness for USGS, George DeBuchananne, testified. He specifically declined to support the impact values in Table S-3, saying there was "considerable uncertainty" about them (J.A. 190). He also raised questions about the suitability of salt as a repository medium, and explained the difficulty of exploring a repository site without destroying its integrity (see J.A. 173-5). He noted the absence of any material for sealing holes drilled into the repository for test purposes (J.A. 184). Those holes provide a pathway for release of radiation into the atmosphere. When asked whether safe repository sites could be found, the witness answered:

> Yes sir, I believe it is possible; but we have not to our satisfaction demonstrated such a site has been located as yet.

(J.A. 190).

The technical difficulties with repository development discussed by USGS were further elaborated in a report to the U.S. Environmental Protection Agency by a special panel of earth scientists, which said that with respect to most areas there could not be "any confidence [even] in orders-of-magnitude estimates of risk probabilities." (See

J.A. 220). Report of Ad Hoc Panel of Earth Scientists: The State of Geological Knowledge Regarding Potential Transport of High-Level Radioactive Waste from Deep Continental Repositories, EPA/520/4-78-004 (June 1978). That report also discussed uncertainties in predicting whether an earthquake will occur at a repository site (*id.* 365-6), and uncertainties concerning future climatic and geologic changes that could adversely affect a repository (*id.* 366-8, 370-1). The report also said that future human intrusions into a repository represent "a risk for which no trustworthy probability estimates may be applied for the time span over which the integrity of the repository is to be assured." *Id.* 362. Indeed, bedded salt deposits were found to be "likely targets for near-term exploitation" because they often contain valuable minerals. *Id.* 369.

Even the NRC staff, in the environmental report prepared for this rulemaking, conceded:

> [T]here are still uncertainties in areas such as the effect of waste presence on repository stability; the probabilities and consequences of intrusive acts by humans; the validity of data used in modeling studies; the design and regulatory actions needed to minimize possibilities of repository failure; projection of future societal habits and demography, and finally, the relative importance of various potential initiating events.

NUREG-0116 at 4-94. During the proceeding NRC staff also acknowledged that there were "considerable uncertainties" with respect to repository design and waste rock interactions (J.A. 134).

The record also indicates considerable uncertainty with respect to the social and political questions. As the Court

below found, "serious concerns were raised over the likelihood of developing the human institutions or political consensus necessary to establish and maintain the hypothesized [repository] facilities." Pet. App. 40a; 685 F.2d at 480-81. See the Statement of Dr. Terry Lash (J.A. 117), discussing the anticipated local opposition to repository siting.

E. Adoption of the Final Rule

On July 27, 1979 the Commission promulgated the Final Rule, Pet. App. 341a, 44 F.R. 45362 (August 2, 1979), and continued to rely on the zero-release assumption. The Commission also announced that it would issue an explanatory narrative to "meaningfully convey the environmental significance of uranium fuel cycle activities." Pet. App. 343a.*

Two of the five Commissioners expressed doubts about the zero-release assumption. Commissioner Gilinsky said the zero-release figure should not be adopted, and noted:

> No such [waste] repository has yet operated. The prospective constructors of such a repository have not yet agreed on a design or even chosen a geologic medium. It seems anomalous, at this stage, for the regulators to express more confidence on this score than the repository designers and builders themselves have expressed.

Pet. App. 389a. Commissioner Bradford, while not dissenting, said that the Table had to be "extensively supplemented," and that the zero-release figure was one of "four weaknesses." *Id.* at 383a. He said that "there are uncertainties here, and the [Hearing] Board's summary of the record has not done them justice." *Id.* 384a (footnote

* A draft narrative was subsequently released, 46 F.R. 15154 (1981), but a final narrative has not been issued.

omitted). He disassociated himself from the NRC's prior expression of confidence in safe waste disposal, *id.*, and said that the rulemaking "kept perfect the past record of the Commission's obsessive need not to know about the uncertainties regarding its waste disposal assumptions." *Id.* 387a.

F. The Decision Below

Petitions to review the Final Rule were filed in September 1979 by the State of New York and the Natural Resources Defense Council, Inc. These two proceedings were consolidated by the Court of Appeals with the pending challenge to the Interim Rule and with the *Vermont Yankee* remand involving the Original Rule. See above, p. 8. The challenges to the Interim and Final Rules, of course, were new proceedings not subject to the *Vermont Yankee* remand.

On April 27, 1982, the Court of Appeals vacated the Original, Interim and Final Rules, and remanded to the NRC for further proceedings. With respect to all three Rules, the Court held that NEPA was violated by the treatment of uncertainties surrounding the waste disposal issue. In addition, the Original and Interim Rules were vacated because no consideration of the health, socio-economic or cumulative impacts of the figures in Table S-3 were permitted in proceedings under those versions of the Rule.

The Court below concluded that in light of the many, admitted uncertainties, the Commission's zero-release assumption, if viewed as a finding of fact, "represents a 'clear error of judgment,' " citing *Bowman Transportation, Inc.* v. *Arkansas-Best Freight, Inc.*, 419 U.S. 281, 285

(1974); *Citizens To Preserve Overton Park, Inc.* v. *Volpe*, 401 U.S. 402, 419 (1971). Pet. App. 39a, 685 F.2d at 480.

The Court then considered the zero-release assumption as a decisionmaking device rather than a factual finding, and held it invalid under NEPA, "not in accordance with law" under § 706(2)(A) of the Administrative Procedure Act, and also arbitrary and capricious. Pet. App. 48a-49a, 685 F.2d at 484-5. The basis for the decision was that the Commission's failure to reflect the uncertainties in Table S-3, coupled with its refusal to allow Licensing Boards to consider them in deciding on applications for new plants, constituted a failure to consider the impacts of uncertainties in the decisionmaking stage. The Commission, said the Court, had to allow the uncertainties to be considered not solely "in a vacuum," Pet. App. 46a, 685 F.2d at 484, but at the licensing stage. The Court said that the NRC could assess the uncertainties generically, so long as it "factor[ed] its assessment into ultimate decisions to license plants." Pet. App. 47a, 685 F.2d at 484 (footnote omitted).

Judge Edwards concurred in these portions of the opinion. Judge Wilkey dissented, saying that the NRC did not exceed its authority, but he misconstrued a most significant fact. Whereas the Final Rule "does not permit reconsideration by individual Atomic Safety and Licensing Boards of the NRC's conclusion that high-level waste can be disposed of as described in Table S-3," Solicitor General ("SG") Petition at 6 (footnote omitted)—and that fact was critical in the Court's decision—Judge Wilkey mistakenly said that the Boards were free to consider uncertainties if they chose to. Pet. App. 147a, n.84, 685 F.2d at 530. This misunderstanding is so vital that it undermines much of the argument in the dissent.

Summary of Argument

The Original, Interim and Final versions of Table S-3 are all invalid under NEPA because the NRC foreclosed consideration of the very large uncertainties regarding its optimistic waste disposal assumptions from the decision-making on new plants. The effect is that Licensing Boards, in passing on applications for new nuclear plants, are compelled to assume that no release will ever occur from sealed nuclear waste repositories, and are barred from considering the many serious underlying uncertainties. Thus, contrary to NEPA's mandate, licensing decisions would be made without consideration of the substantial possibility that the new technology needed for repositories will not be developed or perfected, and that nuclear waste produced by reactors will cause very severe environmental impacts. While the NRC may evaluate the uncertainties generically, it cannot prevent consideration of that issue at the licensing stage. Moreover, the Original and Interim Rules are invalid under NEPA because they did not require, and were construed to preclude, consideration of relevant environmental impacts not embodied in Table S-3.

ARGUMENT

I.

The Table S-3 Rule Violates NEPA Because It Precludes the NRC from Considering the Very Substantial Uncertainties Surrounding the Zero-Release Assumption at the Time Decisions Are Made to Approve Nuclear Plants.

A. The Uncertainties Regarding Nuclear Waste Disposal Are Very Substantial, and the Potential Environmental Harm Is Far Too Serious to Ignore During Licensing Decisions.

Petitioners argue that the Commission could reasonably ignore the possibility of a release of radioactivity from a repository because the probability of such an occurrence is small. However, as previously discussed, no repository has been built, no site has been found meeting all the required physical criteria, and no technology has been found to be satisfactory. There is considerable uncertainty about success at each stage. Moreover, the fact that the repository would have to operate for hundreds of thousands of years, coupled with the difficulty in predicting future geologic events, adds enormous uncertainty. It is therefore evident that there exist very substantial uncertainties whether repositories will be developed, and if so whether they will truly prevent any radioactive releases. In light of the current situation, any conclusion that the possibility of a release from the repository is small is nothing but speculation.*

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* Every number in Table S-3 is subject to some uncertainty, yet the State is contesting only the zero-release aspect of the Final Table. As to that aspect a new technology will be needed for an entirely new type of human endeavor. The uncertainty is very large, and the potential for severe environmental damage is also very great. That is why the uncertainty cannot be ignored in decisionmaking, consistent with NEPA.

I. *Will Repositories Be Developed?*: With respect to the first issue—whether repositories will actually be developed—the Commission noted that "disposal technology has not yet been selected." Pet. App. 364a. But it also said that "the evidence in the record is tentative but favorable" that sites will be found with characteristics that would prevent any escape of radioactivity. *Id.* 366a. The rationale for this conclusion is set forth as follows:

> At the hearing a witness for the U.S. Geological Survey testified that he believed it possible to find sites for repositories that would give the low release rates estimated by the staff. Transcript at 729 [J.A. 190]. Although no specific location has yet been identified as meeting the criteria, the widespread distribution of salt deposits favors the view that suitable sites can be found.[22] Such general evidence, coupled with the absence of any strong argument that a site cannot be found, probably affords as strong a record as can be made on the issue until a specific site has been thoroughly investigated and found to be suitable.[23]

---

22 NUREG-0116 notes that salt deposits have been found in 24 of the 50 States. Sec. 4.4.1.2.

23 In view of the often-cited experience at Lyons, Kansas, it is worth mentioning that the failure of a particular site to meet selection criteria, though discouraging, cannot of itself disprove the feasibility of the bedded-salt repository concept. At Lyons, Kansas, an initially promising site later proved unsuitable because of previously undiscovered bore holes and adjacent mining operations that compromised the integrity of the site. These problems were specific to the site rather than inherent in the concept.

Pet. App. 366a. Based on the above discussion, the Commission concluded that "a suitable bedded-salt repository site or its equivalent will be found," but also agreed that "areas of uncertainty remain" with respect to that conclusion. *Id.* 367a. The Commission also said that even if

bedded salt should prove inadequate, "the strong incentive to develop sound waste disposal methods and the major effort now directed to this goal make it likely that a means of effective isolation will be found among the many geologic disposal techniques being considered." *Id.* 369a, n.27.

This analysis by the Commission is subject to enormous uncertainty. As discussed above (p. 10), the USGS witness on whom the Commission relied, Mr. DeBuchananne, testified about many of the uncertainties regarding the suitability of salt as a repository medium, the difficulty of exploring a repository site without destroying its integrity, and the absence of materials to seal the holes drilled into the repository. The Commission chose not to mention these doubts. But in view of these factual uncertainties, this witness' statement that "I believe it is possible" that repository sites could be found, although none have been, is virtually meaningless—it indicates only that no law of science currently known makes it impossible to find a site. That hardly supports the conclusion that sites actually will be found in the United States. Indeed, the fact that no site had been found, and the failure of the Salt Vault site discussed in footnote 23 of the NRC discussion (above, p. 17), indicate that finding sites meeting all the technical specifications—while not theoretically impossible—may be a most difficult, and possibly unachieved, task.

Similarly, the NRC's optimism based on "the widespread distribution of salt deposits" ignored the USGS witness' questioning of the suitability of salt and the doubts expressed in USGS Circular 779. See above, pp. 8-10. And the Commission's conclusion that because the Nation wants to find a solution it probably will is sheer speculation.

Thus, there is clearly a great deal of technical uncertainty about whether repositories will be established. There is also uncertainty as to whether public opposition will block development of repositories if any suitable sites are found. See above, pp. 11-12. The Commission, however, failed to discuss that question.

II. *If Developed, Will Repositories Prevent Releases of Radioactivity?*: The Commission addressed this question. It evidently adopted the rationale of NRC staff that bedded salt formations "will remain undisturbed into the future, even though mildly modified by placing the wastes into it." Pet. App. 365a, n.21. The Commission found that "characteristics of a bedded-salt repository afford a reasonable basis for the staff's conclusion that the repository can maintain its integrity, provided that sites meeting the selection criteria can in fact be found and developed." *Id.* 366a. The NRC noted that "areas of uncertainty remain regarding . . . the probability that [the repository site] will perform as expected." *Id.* 367a (footnote omitted). The Commission said that releases of radioactivity "through accidental intrusion by man remain possible but in the Commission's view unlikely since casual intrusions should be virtually impossible and sites should be selected in areas offering little incentive for deliberate intrusion in search of natural resources." *Id.* 370a.

Once again, the Commission's statement is subject to enormous uncertainty. For example, whereas USGS Circular 779 says that "the uncertainties associated with hot [nuclear] wastes that interact chemically and mechanically with the rock and fluid system appear very high" (pp. 8-9, above), the NRC concluded that the salt deposits would re-

main the same despite the introduction of hot and radioactive wastes. In addition, the NRC chose to ignore the expert USGS view that reliable geologic predictions far into the future could not be made from the knowledge of past events—and that even if site characteristics now appear favorable for repositories, it cannot be known if they will continue to be so. As previously noted (p. 11), this view was supported by the Panel of Earth Scientists. Indeed, in the draft explanatory narrative for Table S-3 the NRC has acknowledged that "there is no way to predict with any degree of certainty . . . the environmental behavior of long-lived radionuclides, and the occurrence of catastrophic climatic and geologic changes." 46 F.R. 15166 (1981). The NRC there added that "it is difficult to comprehend the immensity of potential changes over long periods of time." *Id.* at 15173.

In addition, the Commission failed to address the impossibility of predicting whether human intrusion would destroy the repository. See discussion of Panel of Earth Scientists, discussed above at p. 11. Indeed the NRC itself has come to concede:

> Simply stated, human intrusion cannot be prevented; in spite of all efforts to avoid sites which may prove attractive to humans, there may be deliberate or inadvertent intrusion.

45 F.R. 31398 (1980). This is in accord with the Commission's view that the probability of sabotage of a nuclear power plant or a nuclear shipment cannot be estimated with any confidence. 45 F.R. 37402 (1980). The impossibility to prevent or even estimate such human acts renders the NRC claim of low probability meaningless. It also increases the already large uncertainty as to whether a tech-

nology which does not yet exist will be so perfectly implemented as to avoid any serious accident for a period much, much longer than any technology has ever performed, or even been expected to perform.

These uncertainties are not only large and significant. They are of cosmic dimensions, and so vast as to swallow the zero-release assumption. They also render meaningless Petitioners' claim that "conservatisms" have been worked into Table S-3. Until the future can be better predicted it cannot be known if an allegedly "conservative" assumption is truly conservative. In addition, the "conservatisms" pale as compared to the dimensions of the unknowns. In light of all these unknowns, the statement by Petitioners that large releases from a repository are unlikely is speculation. The Commission, after all, could not even anticipate the Three Mile Island and other reactor accidents in recent years. It is not able to predict repository failures far into the future.

Commonwealth Edison argues that nuclear waste will present a danger for only about 600 years, and that zero release for that time period can be safely assumed. Com. Ed. Brief at 34. However, as USGS points out, some of the waste will remain toxic for over a million years (J.A. 319-20). Even the NRC, in its draft explanatory narrative, says that the period of concern is 100,000 years for an immediate release (*e.g.*, intrusion or earthquake), and 10,000 years for a slow release. 46 F.R. 15172 (1981). In any case, even a period of 600 years is far too long to allow predictions of future events. The changes that have occurred in the world during the centuries since the year

1383 suggest how little we can predict what the world and society will be like 600 years from now, and how little control we have over potential human intrusions into a repository in the future.

B. NEPA Was Violated by the Prohibition Against Consideration of Uncertainties at the Stage of Licensing New Nuclear Plants.

The purposes of NEPA are declared by Congress, in part, as follows:

> The purposes of this chapter are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; . . .

42 U.S.C. § 4321. The declaration of national environmental policy, in § 4331(a), § 101(a) of NEPA, includes a recognition of "the critical importance of restoring and maintaining environmental quality to the overall welfare and development of man," and a policy "to create and maintain conditions under which man and nature can exist in productive harmony." Pet. App. 430a. In § 4331(b) Congress makes it "the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may—

> (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;

(2) assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;

(3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; . . ."

Pet. App. 430a-431a.

In 42 U.S.C. § 4332, § 102 of NEPA, "Congress authorizes and directs that, to the fullest extent possible: (1) the policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with the policies set forth in this chapter . . ." Pet. App. 431a. In other words, the Atomic Energy Act, 42 U.S.C. § 2011, *et seq.*, "to the fullest extent possible," must be interpreted and administered in accordance with the environmental policies set forth in NEPA as well as the policies set forth in the former Act itself. While NEPA does not require specific substantive decisions by the NRC, it requires the NRC to consider environmental objectives while performing its other duties. *See Public Service Co.* v. *U.S. Nuclear Regulatory Comm.*, 582 F.2d 77, 80-81, 85-86 (1st Cir.), *cert. denied*, 439 U.S. 1046 (1978); *Detroit Edison Co.* v. *U.S. Nuclear Regulatory Commission*, 630 F.2d 450, 454 (6th Cir. 1980); *Grindstone Butte Project* v. *Kleppe*, 638 F.2d 100, 103 (9th Cir. 1981), *cert. denied*, 454 U.S. 965 (1982). And Congress meant what it said when it required Federal agencies to consider NEPA's policies to the "fullest extent possible." The Conference Committee Report on NEPA made clear the intent of Congress that "no agency shall utilize an excessively narrow construction

of its existing statutory authorization to avoid compliance." Conference Report, Rept. No. 91-765, 115 Cong. Rec. H 39703 (Dec. 17, 1969), reprinted at 2 U.S. Code Cong. and Adm. News 2770 (1969).*

In 42 U.S.C. § 4332(2)(C), NEPA requires the preparation of an environmental impact statement for all major Federal actions having a significant impact on the environment. Pet. App. 432a. Nuclear plant licensing is subject to this requirement, and in fact Table S-3 is printed in every environmental impact statement prepared for a specific license application. The purpose of this section of NEPA is not to force the agencies merely to theorize about environmental values; it is to force the agencies to affirmatively consider such values in practical decisionmaking. Thus, in *Weinberger* v. *Catholic Action of Hawaii*, 454 U.S. 139 (1981), this Court said that § 102 of NEPA, 42 U.S.C. § 4332, has two purposes:

> The first is to inject environmental considerations into the federal agency's *decisionmaking process* by requiring the agency to prepare an [environmental impact statement]. The second aim is to inform the the public that the agency has considered environmental concerns in its *decisionmaking process.*

Id. at 143 (emphases added). See also *Andrus* v. *Sierra Club*, 442 U.S. 347, 350 (1979): "The thrust of § 102(2)(C)

* The only exception is that an agency need not comply with a NEPA requirement that is in "clear and unavoidable conflict" with another statutory mandate. *Flint Ridge Development Co.* v. *Scenic Rivers Assoc.*, 426 U.S. 776, 788 (1976). That exception is not applicable here. In *Flint*, this Court said that the "fullest extent possible" language "is a deliberate command that the duty NEPA imposes upon the agencies to consider environmental factors not be shunted aside in the bureaucratic shuffle." *Id.* at 787.

is thus that the environmental concerns be integrated into the very process of agency decisionmaking."

The statutory history of NEPA confirms this point. Senator Jackson, a manager of the NEPA bill in the Senate, explained that § 102 of the bill adopted by the Conference Committee [enacted as 42 U.S.C. § 4332] directed "all agencies to assure consideration of the environmental impact of their actions *in decisionmaking.*" 115 Cong. Rec. S 40416 (Dec. 20, 1969) (emphasis added), cited in *Kleppe* v. *Sierra Club*, 427 U.S. 390, 409 (1976).

This view is further confirmed by regulations implementing NEPA issued by the President's Council on Environmental Quality ("CEQ")—the agency created by the Act to oversee compliance with NEPA by other Federal agencies, 42 U.S.C. § 4344(3). This Court has recognized the the CEQ's interpretation of NEPA "is entitled to substantial deference" because the Council was charged with implementing the Congressional policy. *Andrus* v. *Sierra Club, supra*, 442 U.S. at 358 (1979). The CEQ's interpretation of that policy includes the following:

> Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork—even excellent paperwork—but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment . . .

40 CFR § 1500.1(c). Thus, NEPA is not satisfied unless environmental factors are considered at the time of agency decisions and action—including the time licenses are issued.

Regardless of whether the NRC is formally bound by the CEQ regulations, the CEQ interpretation of the purpose of NEPA carries great weight.

Judge Wilkey incorrectly characterizes the decision below as saying that "it is error for the Commission *to proceed in the face of admitted uncertainties.*" Pet. App. 171a, 685 F.2d at 540 (emphasis in original). In fact, the Court of Appeals said only that the uncertainties had to be considered during the decisionmaking process. Once they are considered during that process, NEPA does not forbid approval of the nuclear facility. For example, in *Alaska* v. *Andrus*, 580 F.2d 465, 473-4 (D.C. Cir.), *vacated in part on other grounds sub nom. Western Oil & Gas Ass'n* v. *Alaska*, 439 U.S. 922 (1978), it was held that NEPA did not bar a Federal offshore oil lease sale once the uncertainties were considered. The Court of Appeals said:

> One of the costs that must be weighed by decisionmakers is the cost of uncertainty—*i.e.*, the costs of proceeding without more and better information. Where that cost *has* been considered, and where the responsible decisionmaker has decided that it is outweighed by the benefits of proceeding with the project without further delay, the courts may not substitute their judgment for that of the decisionmaker and insist that the project be delayed while more information is sought.

(Emphasis in original). That reasoning applies to a decision to license a particular nuclear plant. Once the uncertainties are considered in the cost-benefit analysis for that plant, the NRC, subject to the usual standards of judicial review, could decide to grant the license. But since NEPA is ultimately concerned with the evaluation of specific proposals, it is not satisfied if the uncertainties are ignored at the licensing stage.

The Solicitor General says that the Commission could properly conclude that uncertainties should never be decisive in a licensing proceeding. SG Brief at 27. However, that conclusion makes no sense except in the context of a specific licensing record. Whereas the NRC might be justified, after reviewing the entire record in a specific licensing case, in ruling that the very large uncertainties regarding waste disposal do not warrant denial of *that* license, it is arbitrary and capricious for the NRC to rule that these very large uncertainties can *never* affect the outcome of any permit application, regardless of the record developed in that case. For example, if the cost-benefit analysis for a new plant—which analysis relies on the zero-release assumption in Table S-3—is otherwise in equipoise, the fact that the zero-release assumption is subject to great uncertainty could tip the balance against licensing the plant. *See Matter of Public Service Electric & Gas Co., et al.*, 6 NRC 206, 209 (1977). For the Commission to forbid that outcome *a priori* also represents a refusal to consider environmental issues "to the fullest extent possible," in violation of NEPA, 42 U.S.C. § 4332(1), Pet. App. 431a.*

Commonwealth Edison argues at length that the decision in *Minnesota* v. *NRC*, 602 F.2d 412 (D.C. Cir. 1979), is incorrect because Congress has established a policy of continued licensing of nuclear plants despite the uncertainties surrounding waste disposal. See Com. Ed. Brief at 34-46. However, the *Minnesota* decision was not challenged by the NRC, and it is not before this Court for review. Moreover,

* For example, the NRC may have before it favorable evidence about the alternative of building a coal plant instead of the nuclear plant. If that comparison is otherwise in equipoise, the uncertainties regarding nuclear waste disposal could tip the balance against the nuclear plant.

Congress has not decided to proceed with licensing nuclear plants despite uncertainties regarding nuclear waste. It permits continued licensing only if there is assurance that the public health and safety will not be compromised. See 42 U.S.C. § 2012(d) and § 2013(d), making development of atomic energy dependent on public health and safety. Pet. App. 394a-396a. If the NRC were to conclude that there is no assurance of public health and safety because of the waste disposal problem, it would be required by the Atomic Energy Act to discontinue licensing. This is acknowledged in the Solicitor General's Brief at 10, n.9.

The Waste Confidence proceeding, which the NRC initiated in response to *Minnesota, see* 44 F.R. 61372 (October 25, 1979), focuses on the NRC's duty under the Atomic Energy Act to protect public health and safety. See Solicitor General's Brief at 44. It is not concerned with NEPA, as is the Table S-3 rulemaking. In fact, the Presiding Officer at the Waste Confidence proceeding expressly ruled that NEPA was inapplicable:

> This rulemaking proceeding does not involve a major federal action having a significant impact on the environment, and consequently an environmental impact statement is not required by NEPA . . .

First Prehearing Conference Order, dated February 1, 1980, at 10 (footnote omitted). The Commission, therefore, has totally excluded NEPA from its generic consideration of whether it may, under the Atomic Energy Act, continue to license new plants despite uncertainties over nuclear waste disposal.

Pending a decision in the Waste Confidence proceeding, it is the NRC position that the obligations under the Atomic

Energy Act to protect public health and safety are not violated by continued licensing despite uncertainties surrounding waste disposal. Nonetheless, the Commission cannot license any specific new plant without complying with NEPA, and as part of its NEPA compliance the NRC requires a cost-benefit analysis for each new plant. SG Brief at 35. The decision below, without considering the Atomic Energy Act question, did no more than require that the cost-benefit analysis be allowed to reflect the large uncertainties.

The Commission argues that although it does require a cost-benefit analysis, uncertainties need not be considered because they are not quantified. SG Brief at 35. However, one of NEPA's stated goals is that agencies should give "unquantified environmental . . . values . . . appropriate consideration in decisionmaking along with economic and technical considerations." 42 U.S.C. § 4332(2)(B). Pet. App. 432a. This means that the uncertainties, even if unquantified, had to be considered in some fashion. They could not simply be ignored at the decisionmaking stage, as they are under the Commission's approach. If the cost-benefit analysis for a new plant is otherwise in equipoise, even a non-quantified cost would tip the scale. In fact, NRC regulations requiring the preparation of a cost-benefit analysis for every new plant require that non-quantifiable items be considered "in qualitative terms"—thus indicating that such items could affect the cost-benefit analysis. See 10 CFR §§ 51.20(b), 51.23(c), 51.26(a).

The Commission attempts to discredit the possibility that the record in a specific case will be in equipoise by saying that if "the problem of disposal is insoluble," the

result will be the suspension of all licensing, not just in close cases. SG Brief at 34. While the Commission's statement is correct, it overlooks the existing situation—in which disposal is not known to be insoluble, but is nonetheless very uncertain. In this situation, the uncertainty can affect at least close cases.

Contrary to Petitioners' contentions, the Court of Appeals did not prohibit the use of a generic proceeding to *evaluate* the uncertainties. The Court said that the Commission can "implement NEPA through generic rulemaking," Pet. App. 43a, 685 F.2d at 482, and "can assess generic costs in a generic rulemaking." Pet. App. 47a, 685 F.2d at 484. However, that generic assessment, once made, had to be available for consideration as part of the licensing decision. *Id.* Thus, the Commission could assess the uncertainty generically, and present its treatment to every Board, in a manner which would allow the Boards to balance the uncertainties against other factors in the cost-benefit analysis. For example, the uncertainties could be discussed in a separate narrative that would be considered in the licensing decision. The Solicitor General opposes this approach, saying that "different boards (like different courts) would assign different weights" to the risk. SG Brief at 36. That misses the point. Each Licensing Board would decide what treatment was appropriate in view of the record in the case. Again, if the record is close the uncertainties might be decisive, while in other cases they might not be.

The Court of Appeals did not say that a worst case assumption had to be utilized—one that assumed the release of all the radioactivity in the repository. Its ruling would

be satisfied by a generic discussion of uncertainties that would be considered in licensing decisions.

It was reasonable for the Court of Appeals to treat the large uncertainties as a cost. "[T]he factors relevant to a cost-benefit analysis must be defined to include risks of uncertain harm as a cost," Gelpe and Tarlock, *The Uses of Scientific Information in Environmental Decisionmaking*, 48 Southern Cal. L. Rev. 371, 412 (1974). If that is not done, the uncertainties will inevitably be ignored. The potential benefits of a nuclear plant "are largely economic and easily calculable, but risks are often speculative or of unknown probability and magnitude." Note, *Judicial Review of Federal Environmental Decisionmaking: NRC Regulation of Nuclear Waste Management and Disposal*, 58 Texas L. Rev. 355, 377 (1980). For this reason the uncertainties, if not recognized as a cost, will always be ignored in licensing.

Commonwealth Edison argues (Br. 16) that NEPA does not create any procedural duties beyond those imposed by the Administrative Procedure Act. This argument is erroneous, as NEPA's intent and effect was to establish new procedures, including the procedure for preparing environmental impact statements set forth in 42 U.S.C. § 4332(2)(C), Pet. App. 432a. This Court has said that "the only procedural requirements imposed by NEPA are those stated in the plain language of the Act." *Vermont Yankee, supra*, 435 U.S. at 548. However, § 4332(2)(C)(i), "in plain language," requires that the impact statement include "a detailed statement by the responsible official on—the environmental impact of the proposed action."

Pet. App. 432a. This duty was violated here because Table S-3, with its zero-release assumption, does not give a detailed statement on the potential impacts of nuclear waste. Moreover, NEPA "in plain language" requires that environmental issues be considered "to the fullest extent possible," 42 U.S.C. § 4332(1), Pet. App. 431a, yet the NRC violated this by excluding such consideration of possibly severe environmental impacts from the critical licensing stage.

Petitioners argue that since the Commission itself can play a role in issuing licenses, the Court of Appeals was incorrect in saying that the decisionmaking occurs before the Atomic Safety and Licensing Board ("ASLB"). The answer is that the Commission has largely delegated its role in the licensing process to the ASLB, see 10 CFR §§ 2.721, 2.760, with a right of appeal from the ASLB order not to the Commission but rather to an Atomic Safety and Licensing Appeal Board. *Id.* § 2.785. The Commission, in § 2.786, has the power to review Appeal Board decisions, but need not do so—and if it chooses to review a decision, it decides "the issues to be reviewed." § 2.786(b)(6). Thus, there is no assurance that the Commission will interject itself into the licensing proceedings. But if it does, the effect of the Court of Appeals ruling is that the Commission must then balance the uncertainties in deciding whether or not to license the particular plant—a process that is very different from its abstract consideration of uncertainties in issuing Table S-3. In addition, the Licensing Board and Appeal Board should consider the issue as well, as part of their cost-benefit analysis, in light of the acknowledged purpose of NEPA that consideration of environmental

issues "take place at an early stage in the decision-making process." Solicitor General Brief at 26.

Commonwealth Edison argues that Table S-3 is overly conservative in assuming the release of all fission product gases, and therefore it was excusable to ignore the uncertainties regarding the release of solid high level wastes. Com. Ed. Brief at 24-5. This argument fails, however, because there is no evidence in the record showing that the one assumption fairly compensates for the other. In fact, the opposite appears to be the case. According to the Commission, Table S-3 incorporates the "conservative assumption that fission-product gases in the spent fuel, including all tritium, krypton-85, carbon-14 and iodine-129, would be released during handling and emplacement of the waste prior to sealing of the repository." Pet. App. 364a-365a (footnote omitted). The Table lists the following levels of curies for these elements: tritium—18,100; krypton-85—400,000; carbon-14—24; and iodine-129—1.3, which total about 418,125 curies. The record hardly supports the view that assuming the release of that curie level compensates for the eleven million curies as to which the zero-release assumption governs.

As previously noted (p. 14), Judge Wilkey misunderstood the fact that the Commission was prohibiting its Licensing Boards from considering uncertainties. His discussion of other important issues was misguided as well. For example, he suggested that remand to the NRC will not result in a better decision by the agency because of the complexity in measuring the risk of nuclear waste disposal. Pet. App. 173a, 685 F.2d at 541-2. But the

majority opinion made clear that what needed to be done on remand was to factor uncertainties into the decision-making process, not necessarily to refine the estimate of the risk. Moreover, Judge Wilkey suggested that the Commission did not even have to concern itself about radiation releases from a repository very far in the future because it was "difficult to plan that far ahead." Pet. App. 178a, n.170, 685 F.2d at 544. However, the Commission itself has not said that releases far in the future were legally irrelevant. Indeed, NEPA does not permit Federal agencies to make decisions authorizing the creation of wastes that will be toxic for hundreds of thousands of years, yet refuse to evaluate the problem on the ground that they cannot plan that far ahead. *See Vermont Yankee, supra,* 435 U.S. at 539. Moreover, Judge Wilkey's position is also at odds with what NRC staff called "the philosophy that is now prevalent in the federal [waste disposal] program," which is that this society, which uses nuclear power, "must assume and fulfill responsibility for the effective handling of the problem of nuclear wastes" rather than impose the dilemma on future generations. NUREG-0116 at D-5, citing Marcus Rowden, former NRC Chairman.

II.

The Original and Interim Table S-3 Rules Are Invalid Also Because Consideration of Important Environmental Issues Was Precluded.

On this issue, the State refers to the argument in the Brief of Respondent Natural Resources Defense Council, Inc.

Conclusion

The ruling by the Court of Appeals insofar as challenged herein should be affirmed.

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Respectfully submitted,

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